

LiNbO₃ CRYSTALS

LiNbO₃ Crystal is widely used as frequency doublers for wavelength > 1 μm and optical parametric oscillators (OPOs) pumped at 1064 nm as well as quasi-phase-matched (QPM) devices. Due to its large Electro-Optic (E-O) and Acousto-Optic (A-O) coefficients.

Physical and Optical Properties.

Properties	Values
Crystal Structure	Trigonal, space group R 3c
Cell Parameters	a = 0.515, c = 13.863, Z = 6
Melting Point	1255 +/-5°C
Curie Point	1140 +/-5°C
Mohs Hardness	5
Density	4.64 g/cm ³
Absorption Coefficient	~ 0.1%/cm @ 1064 nm
Solubility:	insoluble in H ₂ O
Relative Dielectric Constant	e _{T11} /e ₀ : 85 e _{T33} /e ₀ : 29.5
Thermal Expansion Coefficients at 25°C	a, 2.0 x 10 ⁻⁶ /K @ 25°C c, 2.2 x 10 ⁻⁶ /K @ 25°C
Thermal Conductivity	38 W /m /K @ 25°C
Transparency Range	420 - 5200 nm
Refractive Indices	n _e = 2.146, n _o = 2.220 @ 1300 nm n _e = 2.156, n _o = 2.322 @ 1064 nm n _e = 2.203, n _o = 2.286 @ 632.8 nm
Optical Homogeneity	~ 5 x 10 ⁻⁵ /cm
Sellmeier Equations(λ in μm)	n _o ² (λ) = 4.9048+0.11768/(λ ² - 0.04750) - 0.027169/λ ² n _e ² (λ) = 4.5820+0.099169/(λ ² - 0.04443) - 0.021950/λ ²
NLO Coefficients	d ₃₃ = 34.4 pm/V d ₃₁ = d ₁₅ = 5.95 pm/V d ₂₂ = 3.07 pm/V
Electro-Optic Coefficients	g _{T33} = 32 pm/V, g _{S33} = 31 pm/V g _{T31} = 10 pm/V, g _{S31} = 8.6 pm/V g _{T22} = 6.8 pm/V, g _{S22} = 3.4 pm/V,
Half-Wave Voltage, DC	3.03 KV
Electrical field z, light ^ z	4.02 KV
Electrical field x or y, light z	
Damage Threshold	200 MW/cm ² (10 ns)
Efficiency NLO Coefficients	d _{eff} =5.7pm/V or~14.6xd ₃₆ (KDP) for frequency doubling 1300 nm; d _{eff} =5.3pm/V or~13.6xd ₃₆ (KDP) for OPO pumped at 1300nm; d _{eff} =17.6pm/V or~45xd ₃₆ (KDP) for quasi-phase-matched structure;

Our Manufacture Technical Capabilities:

Properties	Values
Diameter :	max. 25mm
Length:	max. 30mm
Surface Quality:	better than 20/10 scratch/dig Per MIL-0-13830A
Beam Deviation:	<3 arc min
Optical Axis Orientation:	+/-0.2°
Flatness:	< 1 / 4 @633nm
Transmission Wavfront Distortion:	<1 / 2 @633nm
Coating:	upon customer's Specification

Standard LiNbO3 Wedge:

Material	X(mm)	Y(mm)	Z(mm)	θ	ϕ	AR@(nm)	Product Number
LiNbO3	0.25	1.25	1.25	13°	22.5°	1550	UQT-OCLW0301
LiNbO3	0.25	1.25	1.25	15°	22.5°	1550	UQT-OCLW0302
LiNbO3	0.25	1.25	1.25	13°	22.5°	1310	UQT-OCLW0303
LiNbO3	0.25	1.25	1.25	15°	22.5°	1310	UQT-OCLW0304

Standard LiNbO3 Box:

Dimension(mm)	Coating	Applications	Product Number
5x5x20	AR	SHG or OPO	UQT-OCLB0401
8x8x20	AR	SHG or OPO	UQT-OCLB0402
9x9x25	AR	SHG or OPO	UQT-OCLB0403
10x10x25	AR	SHG or OPO	UQT-OCLB0404

Please Contact [ultiQuest](#) for other dimensions in prototype and production quantities.

NOTES!

- Be sure to wear laser safety goggles when checking optical path and adjusting optical axis.